

## **REMARKS**

The present Amendment is in response to the Examiner's Final Office Action mailed February 17, 2004. Claim 1 is amended and claim 31 is cancelled. Claims 1-30 and 32-33 are now pending in view of the above amendments.

Reconsideration of the application is respectfully requested in view of the above amendments to the claims and the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

### **I. Obviousness Type Double Patenting Rejection**

In the Office Action, the Examiner provisionally rejects claims 1-33 under the judicially created doctrine of obviousness-type double patenting in view of Application Serial Nos. 10/026,044; 10/026,055 and 10/026,016. Applicants submit herewith a terminal disclaimer relative to each of those applications in order to overcome this rejection. Withdrawal of this rejection and allowance of the pending claims is respectfully requested in view of the terminal disclaimer.

### **II. Rejection Under 35 U.S.C. § 103**

The Examiner rejects claims 1-33 under 35 U.S.C. § 103 as being unpatentable over *Jewell et al.* (U.S. Patent No. 6,359,920) in view of *Ishikawa* (U.S. Patent No. 5,841,152). Applicants respectfully traverse this rejection in view of the amendments and following comments.

Embodiments of the present invention are directed to unique laser structures and materials so as to provide, for example, longer wavelength VCSELS than what has otherwise been available in the prior art. In particular, claimed embodiments provide long wavelength quantum wells by introducing relatively high levels of nitrogen in the quantum wells. As noted in the specification, this introduction of nitrogen typically results in a number of negative characteristics, such as reducing confinement in the valence band and resulting in poor material characteristics. See page 11, lines 13-23.

However, the inventor in the present application overcame the undesirable characteristics of introducing nitrogen into the quantum well, while still maintaining the

positive characteristics. This is accomplished by providing strain compensation in the barrier and/or confinement layers by use of specific materials. For example, combinations of nitrogen, aluminum, antimony, phosphorous and/or indium are utilized in the barrier and/or confinement layers on a GaAs substrate-type material so as to provide longer wavelength devices. A number of combinations are disclosed and claimed: confining region comprised of AlGaAs; barrier layer comprised of InGaAs with N; InGaAs with N is introduced in the quantum wells and barrier layers and aluminum is added to the confining layers; and so on.

This of course is in direct contrast to the teachings of *Jewell*. In particular, *Jewell* discusses the use of nitrogen in the quantum well. However, nowhere does *Jewell* discuss or suggest that the confinement and/or barrier layers be comprised of the various combinations and materials presently disclosed so as to overcome the limitations introduced by nitrogen. Indeed, while the Examiner notes that “*Jewell* also disclose alternative substitution elements such as In, Al, N, Sb with the basic material GaAs and the quantum well” (Office Action, Page 6, second paragraph), nowhere does the Examiner cite any aspect of the reference suggesting that these substitution elements be used – in the manner claimed – so as to overcome deficiencies introduced for example by the inclusion of nitrogen. Moreover, nowhere do the other references provide such a teaching.

In view of these noted deficiencies, Applicants submit that the Examiner has failed to set forth a *prima facie* case for obviousness and respectfully request that the rejection be withdrawn with respect to each of the pending claims.

Claim 31 has been cancelled to address the Examiner’s objection that the claim was a substantial duplicate to claim 28.

### **CONCLUSION**

In light of the Amendments and the arguments set forth above, Applicants earnestly believe that they are entitled to a letters patent, and respectfully solicit the Examiner to expedite prosecution of this patent application to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,

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